

Tension between scientific certainty and meaning complicates communication of IPCC reports

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Here we demonstrate that speakers at the press conference for the publication of the IPCC's Assessment Report 5 (Working Group 1)<sup>1</sup> attempted to make the documented broad certainty of anthropogenic global warming (AGW) more meaningful to the public. Speakers sought such meaning through reference to short-term temperature increases. However, when journalists inquired about the similarly short-lengthed 'pause'<sup>2</sup> in global temperature increase, the speakers dismissed the relevance of such timescales, thus becoming incoherent as to 'what counts' as scientific evidence for AGW. We call this the 'IPCC's certainty trap'. Speakers' incoherence led to confusion within the press conference and subsequent condemnation in the media<sup>3</sup>. While the speakers were well intentioned in their attempts to communicate the public implications of the report, these attempts threatened to erode their scientific credibility. In this instance, the certainty trap was the result of the speakers' failure to acknowledge the tensions between scientific and public meanings. Avoiding the certainty trap in the future will require a nuanced accommodation of ongoing uncertainties and a recognition that rightful demands for scientific credibility need to be balanced with

26 **public and political dialogue about the things we value and the actions we take to**  
27 **protect those things<sup>4-6</sup>.**

28

29 In this paper, we assess the relationship between two fundamentals of science  
30 communication: uncertainty and meaning. Uncertainties are everyday matters of concern for  
31 scientists. The majority can be called ‘local’ uncertainties<sup>7</sup> as they reflect an uncertainty  
32 manifest within a single phenomenon. Climate science is replete with such local  
33 uncertainties<sup>8</sup>. Here, we focus on temporally local uncertainties which were the subject of a  
34 number of questions and answers in the press conference under consideration. Examples of  
35 temporally local uncertainties in climate science include the variable effects of volcanoes,  
36 solar cycles, climate sensitivity, El Niño, and the impact of the financial crisis on emissions.  
37 While some of these phenomena are spatially huge, they are temporally local in the sense that  
38 they are hypothesised to have short-term effects and require resolution within broader  
39 theoretical frameworks<sup>7,8</sup>. And yet these problematic, temporally local, uncertainties are  
40 inevitably encountered by climate scientists seeking to produce broader certainties; namely  
41 the concrete, theoretical explanation and detection of Anthropogenic Global Warming  
42 (AGW).

43

44 A second crucial issue, for those concerned with science communication, is that of meaning.  
45 Meaning arises from personal experiences embedded in the local contexts within which  
46 people create and value their lives<sup>4,9</sup>. Acknowledging the importance of local contexts  
47 highlights how different spheres of meaning become relevant in making science public. For  
48 example, a comparison of professional and popular science writing<sup>10</sup> has shown that the  
49 characteristics of scientific claims shift as knowledge is translated from scholarly journals  
50 into more widely read publications. Journal articles largely restrict themselves to answering

51 questions of scientific meaning: ‘what happened?’ and ‘what was the reason for the event?’  
52 Wider audiences, however, are concerned with questions of public meaning related to their  
53 own local contexts: ‘what value should be placed on the event?’ and ‘what action should now  
54 be taken?’  
55  
56 Negotiating the boundary between ‘scientific meaning’ and ‘public meaning’ is a particular  
57 concern for the IPCC for two reasons. First, while the IPCC is committed to providing  
58 policy-neutral advice<sup>11</sup>, it also seeks to facilitate greater understanding of its work amongst  
59 non-specialist audiences<sup>12</sup>, and there are calls for such objectives to be achieved not only  
60 through an increased supply of scientific knowledge but also through such knowledge being  
61 made more publicly meaningful<sup>4,5</sup>. Second, representatives of the IPCC are requested to give  
62 press conferences, events which sit at the boundary between science and the media<sup>13</sup> wherein  
63 officials can make meaning beyond the text and demonstrate authority while still exerting a  
64 degree of control<sup>14</sup>. Here we examine this boundary, building on previous literature on the  
65 communication of climate science uncertainties<sup>15,16</sup> with a qualitative analysis of a novel and  
66 important data source: the press conference transcript.  
67  
68 We argue here that a relationship exists between certainty and meaning in climate science,  
69 that a framework for understanding this relationship can be formed, and that this framework  
70 can be explored using the IPCC as a test case. We do not claim that understanding meaning,  
71 certainty, or the relationship between them is straightforward. Following others<sup>5,17,18</sup> we do,  
72 however, believe that it is reasonable to treat the two concepts as independent of one another,  
73 although further empirical research into the question will be valuable. Investigating the  
74 relationship between certainty and meaning is also useful in helping to understand

75 interactions during the press conference under consideration and the activities of the IPCC  
76 more broadly.

77

78 The degree of certainty regarding AGW has increased since the IPCC's Fourth Assessment  
79 Report in 2007<sup>1</sup>. Indeed, various calls for action on AGW have been premised upon this  
80 increasing certainty<sup>19</sup>. Simultaneously, however, there is a widely-held belief, following  
81 criticisms<sup>4</sup>, that increased certainty has yet to manifest into public meanings powerful enough  
82 to prompt significant personal, political and policy responses (see Fig. 1). That is not to say  
83 that no public meanings about climate change have developed during the lifetime of the  
84 IPCC<sup>20,21</sup>, rather that the certainty of climate change knowledge continues to have greater  
85 scientific than public meaning.

86

87 During the press conference, the IPCC speakers attempted to make climate knowledge more  
88 publicly meaningful by repeated reference to temporally local phenomena such as short-term  
89 temperature change. However, as described above, there are more uncertainties around the  
90 causes of these phenomena and whether they are indeed attributable to AGW. Furthermore,  
91 these phenomena are of a kind with other uncertain, temporally local phenomena such as 'the  
92 pause'<sup>2</sup> which do not incontrovertibly support the AGW hypothesis. Thus, attempts to  
93 increase public meaning through a discussion of temporally local phenomena in this way are  
94 coupled with an erosion of certainty. In this press conference, the IPCC speakers failed to  
95 acknowledge this diminishing certainty, dismissing journalists' questions about 'the pause'  
96 precisely because the phenomenon is uncertain. The simultaneous reliance upon some  
97 temporally local events in order to increase public meaning, and dismissal of other similar  
98 events because they are uncertain, led to confusion, incoherence and negative press coverage

99 following the press conference. This is the certainty trap which the IPCC must avoid in  
100 future.  
101  
102 During the press conference in Stockholm, and in the terms outlined above, there were  
103 frequent considerations of ‘the value which should be placed on AGW’ and considerations of  
104 ‘what should be done’. In a particularly passionate passage, the World Meteorological  
105 Organization’s Michel Jarraud (see Methods for further information on speakers’  
106 organisational roles) argued that “[The] report demonstrates that we must greatly reduce  
107 global emissions in order to avoid the worst effects of climate change” (Jarraud L90-92,  
108 emphasis added). The information, delivered in WG1’s report, “can be use, that should be  
109 used to produce actionable climate information” (L94-96; see Supplementary Information A  
110 for full transcript). There are two observations to be made about these extracts. First, there  
111 seems little doubt that Jarraud attached a great deal of meaning to AGW and believed  
112 particular actions – most notably a significant reduction in global emissions – should be  
113 undertaken. What is also clear, in the repeated use of terms such as “our time” (IPCC’s  
114 Thomas Stocker, L345-346), “our planet” (United Nations Environment Programme’s Achim  
115 Steiner L129), “our only home” (Stocker L507), “our activities” (Jarraud L69), and “we must  
116 greatly reduce global emissions” (Jarraud L90-91) is that the speakers believed AGW to be  
117 meaningful for a collective which is broader than the scientific community, although  
118 ultimately this collective remains unspecified. Second, Jarraud sought to give climate change  
119 meaning *through* certainty. It is ‘the report’ which ‘can be used, should be used’ and which  
120 ‘demonstrates’ the need for action. Within the press conference, the speakers attempt to  
121 leverage scientific certainty to procure public meaning (Fig. 2).

The problem for the press conference speakers was that, while they clearly thought that the certainty of AGW demonstrated the need for public action, it is not entirely clear why that argument should have been publicly persuasive given that literature in the social sciences strongly suggests that little public meaning has been successfully attached to this aggregated, abstract notion of climate<sup>4,5</sup>. Perhaps acknowledging this, speakers attempted to make AGW meaningful by temporally localising the terms of reference, focusing particularly upon recent and short-term climate changes. For example, Jarraud (L84-85), Stocker (L418-420) and the IPCC's Rajenda Pachauri emphasised the fact that "the decade 2001 onwards having been the hottest, the warmest that we have seen" (Pachauri L261-262). Focusing upon these recent decades, we suggest, began to give AGW meaning by situating it within the "normal horizons of time" rather than the epic timescales which are the usual currency of climate science<sup>4</sup> (for an extended version of this analysis, see Supplementary Information B).

However, while a focus on the decadal scale may have helped to make climate change more meaningful it also brought considerable difficulties, in large part because press conference speakers asserted that "periods of less than around thirty years... are less relevant" (Stocker, L582-583). Thus, publicly meaningful phenomena were actually incorporated at the expense of certainty (Fig. 3).

What became apparent throughout the press conference is that increasing public meaning at the expense of certainty was particularly problematic, not least because of journalists' extended focus upon the 'hiatus' or 'pause'<sup>2</sup> in the rate of increase in global mean surface temperature since the late 1990s. The pause was brought into play once timeframes of less than thirty years were considered relevant for assessment by the press conference speakers. Thus, by temporally localising AGW in order to give the debate meaning, the spotlight also

fell upon sources of scientific uncertainty. This did not escape the attention of journalists at the press conference, who were particularly interested in this temporally meaningful pause (for an extended version of this analysis, see Supplementary Information C), with six out of eighteen journalists asking whether the pause undermined the IPCC's findings. David Rose of the UK's Mail on Sunday tackled the topic forcefully, asking "how much longer will the so-called pause or hiatus have to continue before you would begin to reflect that there is something fundamentally wrong with the models?" (L772-774).

Various attempts were made by the IPCC speakers to downplay the importance of the pause. Stocker repeatedly pinpointed a lack of published literature as a problem (L436-437, L568-571) and claimed that temperature trends that last for less than thirty years should be treated as significantly less important than trends that last over thirty years (L580-584, L793-795). This 'temporal segmentation'<sup>7</sup> enabled the pause to be dismissed as scientifically irrelevant, suggesting that journalists' questions on the matter could be ignored. Jarraud offered just such a dismissal to Rose's question, which he claimed was "from a scientific point of view... what we would call an ill-posed question" (L827-828), essentially dismissing Rose as scientifically illiterate. The terms of this dismissal, however, appear inconsistent with the temporally localised claims made by speakers during the press conference. The speakers oscillated between two positions: one of broad certainty but little public meaning, the other of public meaning but little broad certainty (fig. 4). This striking incoherence was noted by Alex Morales of Bloomberg News who asked why fifteen year periods are considered by the speakers if they hold no scientific value (L965-969).

When Rose<sup>3</sup> published his article the following day, the quote "your question is ill-posed!" was given headline status, and derided as a misjudged response to "a simple question". We

do not wish to claim here that Rose was particularly sympathetic to the IPCC prior to the press conference<sup>22,23</sup>, but in this instance his question was well-founded. It exposed how attempts during the press conference to increase public meaning undermined the very scientific certainty that representatives were trying to communicate, and then leverage, in order to procure public meaning.

Climate change is a science/policy arena where consistent attempts are made to communicate the certainty of AGW theory, and the broad level of consensus over certain facets of that theory in the literature<sup>24,25</sup>. Within this context, a spotlight on scientific uncertainties may be regarded as unwelcome, as the pause proved to be in the press conference. However, we argue that this spotlight is an unavoidable byproduct of attempts to make scientific certainty publicly meaningful by emphasising the temporally local.

This insight implies that seeking to persuade citizens of the case for climate action solely through expositions of the certainty of AGW, and the scientific consensus on the topic, may be a moribund strategy. For while the IPCC has been able to establish greater certainty around AGW (Figure 1) the attempts by IPCC speakers at the press conference to ground their conclusions with reference to temporally local, publicly meaningful events (Figure 2) threatened the credibility of the certainty they wished to convey (Figure 3). This was not lost on the assembled media, whose questions prompted an incoherently oscillating position regarding the appropriate timescales to be considered within climate science (Figure 4). If IPCC speakers are to avoid this certainty trap in the future, they must be better availed of the competing tensions between scientific certainty and public meaning, and the particular difficulties faced by scientists when trying to communicate their findings in a meaningful fashion. In particular, public dialogue has a key role to play in making climate science



knowledge meaningful. We should strive for an approach to climate change which breaks free of the certainty trap to better include public dialogue, values, visions and beliefs<sup>4,6,17,20,26,27</sup>.

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## **Acknowledgements**

Warren Pearce acknowledges the support of the Leverhulme Trust's Making Science Public  
programme (RP2011-SP-013). Greg Hollin's research is supported by a Mildred Blaxter  
Post-Doctoral Fellowship from the Foundation for the Sociology of Health and Illness. We  
would like to thank Tamsin Edwards, Mike Hulme and Brigitte Nerlich, colleagues at  
Science and Democracy Network, and the anonymous peer reviewers for comments which  
have helped us to improve the argument. Responsibility for the content of the paper remains  
ours alone.

## **Author Contributions**

Both GH and WP contributed fully to all aspects of this submission and acknowledge joint  
first-authorship.

## **Conflicting Interests**

Neither GH nor WP has any conflict of interest with regard to this paper.

## **Figure Legends**

**Fig. 1:** Since the last IPCC report, certainty has increased concerning AGW. Speakers at the  
press conference stressed this increase:

288 “the evidence for human influence has grown since AR4, it is now deemed  
289 extremely likely that human influence has been the dominant cause of the observed  
290 warming.” (Steiner L153-155).

291 However, social scientific research has argued<sup>4</sup> that the issue of AGW is yet to attain enough  
292 public meaning to prompt significant personal, political and policy responses. Figure 1 thus  
293 shows an upward shift along the y-axis, representing increased broad certainty, but no  
294 movement on the x-axis, representing the continued dominance of scientific meaning.  
295

296 **Fig. 2:** Within the press conference, speakers attempted to leverage the certainty  
297 demonstrated in the AR5 report – a report which is explicitly not concerned with public or  
298 society – in order to procure public meaning and policy change:

299 “[The] report demonstrates that we must greatly reduce global emissions in order to  
300 avoid the worst effects of climate change.” (Jarraud L90-92)

301 In Figure 2 we represent this move with a horizontal shift along the x-axis (to position 3); a  
302 utilization of certainty in order to procure public meaning.  
303

304 **Fig. 3:** The speakers drew upon temporally local events in order to give AGW public  
305 meaning during the press conference:

306 “the decade 2001 onwards having been the hottest, the warmest that we have seen”  
307 (Pachauri L261-263).

308 The speakers understood these temporally local phenomena to be less certain than the overall  
309 theory of AGW:

310 “periods of less than around thirty years... are less relevant” (Stocker, L582-583).

311 Thus, publically meaningful phenomena were actually incorporated at the expense of  
312 certainty. Therefore, the intended move to the top-right quadrant (position three) was not  
313 achieved. Instead the move was to the bottom-right quadrant (position four).

314

315 **Fig. 4:** Drawing upon temporally local, publically meaningful information (‘the hottest  
316 decade’) proved problematic, as it lent legitimacy to the discussion of other local  
317 uncertainties, such as the 15-year ‘pause’. Speakers were repeatedly challenged on the  
318 uncertainties connected to this phenomenon:

319 “Your climate change models did not predict there was a slowdown in the warming.

320 How can we be sure about your predicted projections for future warming?”

321 (Harrabin L560-562)

322 Faced with these challenges, speakers retreated from temporally local, publicly meaningful  
323 data (position 4) to reaffirm AGW’s broad certainty (position 2):

324 “we are very clear in our report that it is inappropriate to compare a short term  
325 period of observations with model performance” (Stocker L794-796).

326 This retreat led to confusion, incoherence, and criticism within the press conference.

## 1   **Methods**

2

3   Publication in journals cannot be relied upon as a means of communicating research outputs  
4   beyond the scientific community; less than 0.005% of scientific papers outside of health and  
5   medicine were reported in the mass media between 1990 and 2001<sup>28</sup>. Press conferences,  
6   therefore, are a means for scientists to reach non-specialist audiences and provide an  
7   important location for the study of science communication. Where the issue under  
8   consideration is of political importance, such as climate change, press conferences take on  
9   greater significance as they offer a demarcation line between the relatively closed processes  
10   of scientific assessment, during which the publication of provisional findings are likely to be  
11   discouraged, and the point at which a peer-reviewed scientific publication can be made public  
12   via the media<sup>13</sup>. Thus, the press conference represents a “constitutional stage” upon which  
13   officials can impart meaning beyond the text and demonstrate authority, while still exerting a  
14   degree of control over proceedings<sup>14</sup>. The press conference also, however, marks the point at  
15   which the authors of a report begin to lose control of meaning, the inescapable moment at  
16   which the report begins to take on a life of its own following publication.

17

18   Despite the importance and unique features of a scientific press conference, there are no  
19   detailed analyses of these events in the literature, although they are acknowledged as a part of  
20   the difficult boundary between science and the media<sup>13,29,30</sup>. This paper begins to address this  
21   empirical gap by examining the IPCC press conference held in Stockholm, Sweden on  
22   September 27, 2013 to present the Summary for Policymakers for Working Group 1 of the  
23   Fifth Assessment Report<sup>1</sup>.

24

25   The press conference began with a sequence of presentations by six speakers:

26 Ban Ki-Moon (United Nations)

27 Michel Jarraud (Secretary General, World Meteorological Organization)

28 Achim Steiner (Executive Director, United Nations Environment Programme)

29 Rajenda K. Pachauri (Chair, IPCC)

30 Qin Dahe (Co-Chair, IPCC WG1)

31 Thomas Stocker (Co-Chair, IPCC WG1)

32 The presentations were followed by questions from a total of 18 journalists, all but one of  
33 which were answered by Jarraud, Pachauri or Stocker. We viewed the press conference as it  
34 was aired live on BBC News 24 and subsequently transcribed a recording. The transcript is  
35 12,400 words in length and is presented in full in Supplementary Information A. The  
36 transcript is produced verbatim from the words uttered during the press conference and  
37 apparent errors of speech have not been corrected. Quotes taken from the transcript are  
38 supplied with line numbers, to ease cross-referencing with the full transcript.

39

40 The transcript was coded for language related to the two categories being studied: meaning  
41 and certainty. Our understanding of meaning arises from work conducted by Fahnestock, who  
42 provides a simple taxonomy of four questions which account for the development of issues in  
43 the public sphere; ‘what happened?’, ‘what is the reason for the event?’, ‘what value should be  
44 placed upon the event?’, and ‘what action should be taken now?’<sup>10</sup>. In her comparison of  
45 professional and popular science writing, Fahnestock shows how the characteristics of claims  
46 shift as knowledge is translated from scholarly journals into more widely read publications.  
47 In particular, Fahnestock shows that journal articles largely restrict themselves to answering  
48 the question ‘what happened?’, allocating considerable space to validating the answer to the  
49 question through a description of research methods. Wider audiences, however, are  
50 concerned with larger public issues than the deliberately restricted claims served up for a

51 narrow audience of specialist scientists. Such concerns lead on to questions concerned with  
52 the causality, value and implications of an event. Following Fahnestock, therefore, we were  
53 able to code statements relating to meaning into one of four categories and determine whether  
54 utterances had more in common with the statements most frequently found in scientific  
55 publications ('scientific meaning') or the public sphere ('public meaning').

56

57 Similarly, we searched for utterances concerned with the certainty of scientific findings. We  
58 used Star's<sup>7,31</sup> division between 'local' and 'global' (here renamed local and broad), as well  
59 as specific literatures relating to climate change<sup>4,8,9</sup> to determine whether certainty-statements  
60 referred to large or small scale (temporally and spatially) events. When explanations for  
61 uncertainty were proffered, we again referred to literature from sociology and science and  
62 technology studies, which has considered this question in depth, in order to classify the nature  
63 of those responses<sup>7,15,16,31–35</sup>.

64

65 Finally, we identified patterns in the data which were suggestive of a relationship between  
66 these two categories of certainty and meaning, and employed principles of narrative analysis  
67 to ensure, firstly, the veracity and faithfulness of our data interpretation<sup>36</sup> and, secondly, that  
68 the data presented provide a robust representation of how the IPCC speakers communicated  
69 during the press conference.

70

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